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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------------------------|------------------|
| 10/729,270 | 12/05/2003 | Albert A. Vierheilig | 113222-132 | 1614 |
| 28089 7590 01/09/2007 WILMER CUTLER PICKERING HALE AND DORR LLP 399 PARK AVENUE NEW YORK, NY 10022 | | | EXAMINER DOUGLAS, JOHN CHRISTOPHER | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1764 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | NOTIFICATION DATE | DELIVERY MODE |
|--|-------------------|---------------|
| 3 MONTHS | 01/09/2007 | ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 01/09/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| | | | |
|------------------------------|-----------------|-------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/729,270 | VIERHEILIG ET AL. | |
| | Examiner | Art Unit | |
| | John C. Douglas | 1764 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-121 is/are pending in the application.
- 4a) Of the above claim(s) 93-99 and 121 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-92 and 100-120 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-121 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Examiner acknowledges the response filed on 10/16/2006 containing amendments to the claims and remarks.

Examiner acknowledges that claims 1, 16, 30, 44, 57, and 67 are amended and claims 93-99 and 121 are withdrawn.

Response to Arguments

Applicant's arguments, see remarks, filed 10/16/2006, with respect to the rejection(s) of claim(s) 1-92 and 100-120 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the additional reference of Poirier (US 5951851).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-92, 100-120 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vierheilg (US 6028023) in view of Poirier (US 5951851).

1. With respect to claims 1, 2, 12, 17, 26, 30, 32, 40, 46, 53, 57, 62, and 72, Vierheilg discloses a material for use in a FCC process comprising, hydrotalcite-like compound with the formula $(X^{2+}_m Y^{3+}_n (OH)_{2m+2n})OH_n \cdot bH_2O$, wherein X^{2+} and Y^{3+} are cations, m and n are selected such that the ratio of m/n is about 1 to about 10, a will have a value of 1, 2 or 3, b will range from 0 and 10, where the X is Mg, Ca, Zn, Mn, Co, Ni, Sr, Ba, Fe or Cu and the Y is Al, Mn, Fe, Co, Ni, Cr, Ga, B, La or Ce (see Vierheilg,

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column 12, lines 15-27). The compound being prepared by preparing a mixture of a divalent cation and a trivalent cation in an aqueous slurry, heating at a temperature of less than 250 degrees C to dry the compound to produce variable shaped bodies, heat treating the shaped bodies at a temperature between 300 and 850 degrees C, hydrating the heat treated compound to produce a hydrotalcite-like compound, and performing an optional drying step, where the hydrotalcite-like compound has an XRD pattern which has a 2 theta peak position nearly identical to ICDD card 35-965 (see Vierheilig, column 6, lines 44-51, column 8, lines 34-51, column 9, lines 49-55, column 10, lines 8-11, and column 19, lines 47-55).

Vierheilig does not disclose where the Hydrotalcite-like compound is used in an FCC catalyst to remove sulfur from petroleum.

However, Poirier discloses using hydrotalcite to remove sulfur from hydrocarbon fluids (see Poirier column 2, line 64 – column 3, line 14).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Vierheilig to include contacting hydrocarbon fluids with hydrotalcite in order to remove sulfur from the hydrocarbon fluids.

2. With respect to claims 3, 18, 33, and 47, Vierheilig discloses where the XRD pattern has a 2-theta peak position between 8 and 15 degrees (see Vierheilig, column 19, lines 47-61 and Figures 6 and 7).

3. With respect to claims 4, 16, 34, 44, Vierheilig discloses where the reaction mixture further comprises a metallic oxidant selected from the group consisting of

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platinum, palladium, rhodium, iridium, molybdenum, tungsten, copper, manganese, cobalt, iron, and ytterbium (see Vierheilig, column 24, claim 6).

4. With respect to claims 5, 19, 35, and 48, Vierheilig discloses where the amount of metallic oxidant is 15% (see Vierheilig, column 18, Table 1).

5. With respect to claims 6, 7, 20, 21, 31, 45, 63, 67, 73, Vierheilig discloses where the shaped bodies comprise a support comprising calcium aluminate (see Vierheilig, column 18, lines 16-42).

6. With respect to claims 8, 9, 22, 23, 36, 37, 49, 50, 58, 59, 68, and 69, Vierheilig discloses where divalent cation is Magnesium and the trivalent cation is Aluminum (see Vierheilig, column 1, lines 5-19).

7. With respect to claims 10, 11, 24, 25, 38, 39, 51, 52, 60, 61, 70, and 71, Vierheilig discloses where the divalent compound is magnesium hydroxide and the trivalent compound is aluminum acetate (see Vierheilig, column 1, lines 5-19).

8. With respect to claims 13-15, 27-29, 41-43, 54-56, 64-66, and 74-76, Vierheilig discloses where the Hydrotalcite-like compounds are sorbents that comprise 10% of the FCC catalyst (see Vierheilig, column 16, lines 1-23).

9. With respect to claims 77-80, Poirier discloses where a Hydrotalcite-like compound is used to remove sulfur from petroleum (see Poirier, column 2, line 64 – column 3, line 14) and Vierheilig discloses where the Mg/Al ratio is between 2:1 to 5:1 and has an XRD pattern with a reflection at a two theta peak position at about 43 degrees and about 62 degrees (see Vierheilig, column 20, line 66 – column 21, line 6 and Figure 10).

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10. With respect to claims 81-83 and 102, Vierheilig also discloses where the HTL compound is a dried or calcined shaped body (see Vierheilig, column 4, lines 25-35, column 10, lines 8-11, and column 18, lines 26-43).
11. With respect to claim 84, Vierheilig discloses where the Magnesium oxide is at least 52-wt% (see Vierheilig, column 18, Table 1).
12. With respect to claims 85-86, Vierheilig discloses where the reaction mixture further comprises a metallic oxidant selected from the group consisting of platinum, palladium, rhodium, iridium, molybdenum, tungsten, copper, manganese, cobalt, iron, and ytterbium (see Vierheilig, column 24, claim 6).
13. With respect to claims 87-89, 100, and 101, Vierheilig discloses where the support is made from zinc titanate (see Vierheilig, column 15, lines 46-61).
14. With respect to claims 90-92, Vierheilig discloses where the Hydrotalcite-like compounds are sorbents that comprise 10% of the FCC catalyst (see Vierheilig, column 16, lines 1-23).
15. With respect to claim 103, Vierheilig discloses where the hydrotalcite like compound is a collapsed hydrotalcite like compound (see Vierheilig, claim 9).
16. With respect to claims 104, 106-108, 113-115, Vierheilig discloses where a Hydrotalcite-like compound is used in an FCC catalyst to remove sulfur from petroleum (see Vierheilig, column 15, lines 16-27) and where the Mg/Al ratio is between 2:1 to 5:1 and has an XRD pattern with a reflection at a two theta peak position at about 43 degrees and about 62 degrees (see Vierheilig, column 20, line 66 – column 21, line 6 and Figure 10 and MPEP 2144.05 I.).

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17. With respect to claim 105, Vierheilig discloses heat treating the shaped bodies at a temperature between 300 and 850 degrees C (see Vierheilig, column 8, lines 34-51).

18. With respect to claims 109-111, Vierheilig discloses where the HTL compound is a dried or calcined shaped body (see Vierheilig, column 4, lines 25-35, column 10, lines 8-11, and column 18, lines 26-43).

19. With respect to claim 112, Vierheilig discloses where the Magnesium oxide is at least 52-wt% (see Vierheilig, column 18, Table 1).

20. With respect to claims 116 and 117, Vierheilig discloses where the reaction mixture further comprises a metallic oxidant selected from the group consisting of platinum, palladium, rhodium, iridium, molybdenum, tungsten, copper, manganese, cobalt, iron, and ytterbium (see Vierheilig, column 24, claim 6).

21. With respect to claims 118-120, Vierheilig discloses where the shaped bodies comprise a support comprising calcium aluminate (see Vierheilig, column 18, lines 16-42).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone

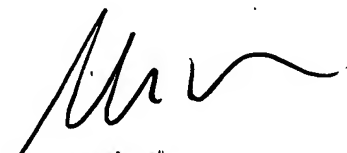
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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCD

1/3/2007



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